



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/GB99/00654</p> <p>(22) International Filing Date: 3 March 1999 (03.03.99)</p> <p>(30) Priority Data: 9805760.7 18 March 1998 (18.03.98) GB</p> <p>(71) Applicant (for AT AU BE BR CA CH CN CY CZ DE DK ES FI FR GB GR ID IE IL IN IT JP KR LU MC MX NL NO PL PT RO RU SE TR UA only): N.V. RAYCHEM S.A. [BE/BE]; Diestsesteenweg 692, B-3010 Kessel-Lo (BE).</p> <p>(71) Applicant (for MG only): RAYCHEM LIMITED [GB/GB]; Faraday Road, Dorcan, Swindon, Wiltshire SN3 5HH (GB).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): WAMBEKE, Alain [BE/BE]; Solveld 32, B-3440 Zoutleeuw (BE). VANDER-LINDEN, Michel [BE/BE]; Bierbeekstraat 25, B-3052 Blanden (BE). ALAERTS, Roger [BE/BE]; Speelhovenstraat 6, B-3200 Aarschot (BE).</p> <p>(74) Agent: JAY, Anthony, William; Raychem Limited, European Patent Dept., Faraday Road, Dorcan, Swindon, Wiltshire SN3 5HH (GB).</p>		<p>(81) Designated States: AU, BR, CA, CN, CZ, ID, IL, IN, JP, KR, MG, MX, NO, PL, RO, RU, TR, UA, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report.</p>
<p>(54) Title: SIDE ENTRY CABLE GUIDE</p> <div data-bbox="235 1113 1323 1606"> </div> <p>(57) Abstract</p> <p>A cable guide having a protective wall defining a through channel, in which cables enclosed by the wall may be supported and guided as they pass longitudinally through the cable guide, wherein the cable guide is provided with a passageway in the protective wall through which cables may be passed out of the channel laterally with respect to the cable guide.</p>		

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SIDE ENTRY CABLE GUIDE

This invention relates to a cable guide for use in a cable management or organisation system and in particular to a cable guide for use in a fibre optic management or organisation system.

Cables are used in a variety of technologies and it is necessary in many instances for specific steps to be taken to organise or manage the cables in a given system.

Cable management in fibre optic systems is particularly important because of the nature of the optical fibres themselves. Fibre optic cable being formed of glass fibres has a limited range of bending and must be maintained above a minimum bend radius during use and storage. Excessive bending can lead to impaired transmission and if severe could lead to transmission loss. Fibre optic management systems or distribution centres, therefore, need to be designed to minimise fibre optic impairment or damage by properly supporting the cables along predetermined paths and protecting them from bends sharper than a given minimum bend radius. In addition in certain industries the number of cables, such as optical fibres, required within a particular management system is constantly increasing and even simple systems have a high density of cables. It is necessary in such cases to house and organise the cables in an efficient manner to avoid excessive installation and/or repair times. In some cases the individual cables need to be readily identifiable and accessible at all times. Additional problems in organisation may also occur where there is a need for the system to allow for modification and expansion.

For some cables, in particular fibre optic cables, it is necessary to provide means for guiding and supporting cables as they pass from one area to another. Such means may generally take the form of a cable guide having a guide channel and a protective wall which encloses the cables on all sides to provide maximum protection. It is, however, necessary in certain instances, for example during modification or expansion of the system in which the cables are situated, to remove the cables from the cable guide. In conventional systems it would be necessary to disconnect the cable at one end so that it may be threaded longitudinally through the cable guide. Such a process is time consuming and leads to inefficient installation and/or repair of systems.

There is, therefore, a need to improve means for guiding and supporting cables which allows the cables to be protected from external damage but which allows for quick and easy access to cables and in particular allows them be removed from the means by which they are supported and guided without requiring disconnection at one end.

According to one aspect of the present invention there is provided a cable guide having a protective wall defining a through channel, in which cables enclosed by the wall may be supported and guided as they pass longitudinally through the cable guide, wherein the cable guide is provided with a passageway in the protective wall through which cables may be passed out of the channel laterally with respect to the cable guide.

The passageway may be open at all times or means may be provided for closing the passageway in the protective wall. For this purpose the cable guide may be provided with means for transposing it from a first, or closed protecting, position to a second, or open, position. A part of the protective wall may, for example, be movable to open the passageway and allow cables to be passed out laterally through that part of the wall. For this purpose that part of the wall may be formed from a flexible material to allow the part of the wall to be flexed from the open to the closed position or the part of the wall could be movably (e.g. pivotally) mounted with respect to at least another part of the wall. Alternatively the cable guide may be composed of more than one component, with the passageway extending through two or more of those components and those components being relatively movable. The passageway may be fully open allowing cables to be passed laterally out of the cable guide when the two components are properly aligned, i.e. with their passageways being properly aligned, and the passageway being closed without such alignment.

Means may be provided for retaining the passageway in one or either the open or closed positions. Such means may take any suitable form such as cooperating engagement means, e.g. resilient projections, lugs etc and corresponding retaining recesses as required.

The passageway is preferably orientated and positioned in use so as to allow removal of cables in substantially the same plane as they are being directed, used or stored.

The cable guide may be provided with means for mounting it within apparatus in which it is to be used. It may, for example, be provided with means for mounting it on a housing in a situation where it acts as an outlet guide for supporting and protecting cables as they pass out from that housing. The means of mounting the cable guide are advantageously such as to allow cables to be passed out through the passageway, i.e. the mounting preferably does not block access to the passageway. For this purpose the mounting means may itself be provided with an opening or groove which can be aligned with the passageway on the cable guide. It is preferred that the cable guide be mounted so that the passageway is outside of any housing on which it is mounted. The cable guide may be a separate or integral component of any apparatus in which it is to be used. It could, for example, be an integral part of a housing or a separate component mounted thereon.

The cable guide may be provided with means of dividing its guide channel so as to allow for further organisation of cables passing therethrough. A dividing rod may be provided for this purpose. It may be an integral component of the cable guide, but preferably is removable therefrom to provide maximum versatility, e.g. by variations in the use, positioning and orientation of the channel dividing means. In this way cables having differing functions or direction of travel can be separated.

The cable guide may be formed of any suitable material such as will be well known to the skilled man. It may take the form of a single component or it may be formed from one or more modular components. The cable guide may, for example, be formed from a plurality of components which can be interlocked together to form a protective wall defining a guide channel. It has been found advantageous to provide a set of modular parts from which a variety of cable guides may be constructed.

According to another aspect of the invention there is provided a kit of modular components capable of being fitted together to form a cable guide having a protective wall defining a guide channel in which cables enclosed by the protective wall may be supported and guided as they pass longitudinally through the cable guide, which kit of parts may also

be fitted together to form a second cable guide having a protective wall defining a guide channel in which cables enclosed by the protective wall may be supported and guided as they pass longitudinally through the cable guide, which second cable guide differs in shape and/or form from the first cable guide.

The kit of modular components may be such as to allow two or a variety of differing shapes of guide channel to be formed. The first cable guide may, for example, have a substantially circular cylindrical guide channel whereas the second cable guide may have a square or oval cylindrical channel. The kit of modular components is preferably such that one of the cable guides which may be formed is a cable guide substantially as hereinbefore described, i.e. one having a passageway for the lateral removal of cables from the guide channel.

Means for interlocking the individual modular components of the kit may take the form of a separate component or the individual modular components may be provided with integral means for their interlocking connection. The individual modular components are preferably provided with integral means for their interconnecting snap engagement.

The present invention is advantageous as it provides a cable guide able to entirely surround cables being guided and supported so as to provide them with maximum protection at the same time as allowing them to be removed from the cable guide without requiring their disconnection at one end. Such a cable guide, i.e. one provided with means for the easy lateral removal of cables guided through its guide channel allows for quick installation of a cable within a given system and in particular allows for the modification of that system or its repair without the need for the cable to be disconnected and subsequently longitudinally threaded through the cable guide. Furthermore, a kit of parts for the formation of at least two differing cable guides is advantageous as allows for the shape and/or form of the cable guide to be varied as required for the particular use or application of the cables to be guided.

For a better understanding of the present invention, and to show how the same may be put into effect, for the purpose of illustration only, reference will now be made to the accompanying drawings in which:

Figure 1 is a perspective view from the front and one side of a first embodiment of a cable guide according to the present invention;

Figure 2 is a perspective view from the rear of the first embodiment of Figure 1;

Figure 3 is a perspective view from the front and the other side of the first embodiment shown in Figure 1;

Figure 4 is a perspective view from the front and towards one side of the embodiment of Figures 1 to 3 shown in use in a fibre optic patch panel;

Figure 5 is a perspective view from the front and the other side of the embodiment shown in Figure 4;

Figure 6 is a perspective view of a kit of parts according to the present invention shown in their separate and interconnected form;

Figure 7 is a perspective view from the front and towards one side of a cable guide formed from the kit of parts shown in Figure 6;

Figure 8 is a front perspective view of the embodiment of Figure 7;

Figure 9 is a rear perspective view of the embodiment shown in Figures 7 and 8;

Figure 10 is a front perspective view of the embodiment shown in Figures 7 to 9 with an additional component; and

Figure 11 is a further embodiment of a cable guide according to the present invention.

A first embodiment of a cable guide according to the present invention shown in Figure 1 comprises a substantially funnel or trumpet shaped sheath 1 defining a through channel 2 through which cables or fibres (not shown) can be longitudinally guided. So that it may be attached to apparatus to which it to be used the cable guide is mounted within a mounting bracket 3. The mounting bracket 3 is provided with a circular opening within which the cable guide can be mounted. To maintain it in the mounting bracket 3 the cable guide is provided with two parallel extending mounting collars 4, 5 one or both of which may be formed as an integral flange. One of the mounting collars 4 extends to the front of the mounting bracket 3 in use, whilst the other collar 5 extends to the rear. A passageway or slot 6 is formed throughout the entire cable guide, i.e. through sheath 1, outer mounting collar 4 and rear mounting collar 5. The passageway 6 is of a size such as to allow a cable to be passed therethrough and so be laterally introduced into or removed from the guide

- 6 -

channel 2. The passageway 6 is generally defined by parallel extending edges 7 of the cable guide. The shape of those edges 7 may be varied to vary the shape of the passageway 6. In the embodiment shown one edge 7a is provided with a transversely projecting part or nose 8 which extends into the passageway 6 and the other edge 7b is provided with a corresponding recess part which extends away so that together they define a sinuous bend in the passageway 6. This shaping of the passageway reduces the likelihood of cables accidentally slipping through the passageway 6. The mounting bracket 3 is provided with its own passageway 8 which is also of a size to allow a cable to be passed therethrough. The cable guide 1 is turnable within the mounting bracket 3 about its own longitudinal axis and when it is turned to a position in which the passageway 6 on the cable guide is aligned with the passageway 8 on the mounting bracket 3 a cable passing through the guide channel 2 may be laterally removed without requiring disconnection at one end and subsequent longitudinal removal. The mounting bracket 3 is provided with two locating apertures 9. The locating apertures 9 are able to accommodate a corresponding locating pin 10 provided on the cable guide. When the locating pin 10 is located in one of the locating apertures 9 the cable guide is locked into a closed position as shown in Figures 1 to 3 and when the locating pin 10 is accommodated within the other locating aperture 9 the cable guide is locked into an open position in which the passageway 6 and passageway 8 are aligned to allow cables to be laterally removed. The locating pin 10 is provided with an upwardly extending tab to facilitate its transposition from the open to the closed positions.

Figures 4 and 5 show a cable guide 11 according to the present invention mounted upon a bracket 12 which is in turn attached to a connection tray 13 of a fibre optic connection system. The connection tray 13 is provided with an upstanding fibre optic patch panel 14 in which an array of connectors 15 are mounted. In use a plurality of fibre optic cables (not shown) would be connected to the connectors 15 and then guided out of the connection tray 13 through the guide channel 11. Lateral movement of the cables in and out of the cable guide 11 can be effected by aligning a passageway 16 provided in the cable guide 11 with a passageway 17 provided in the bracket 12. The entire passageway (16 and 17) is open when aligned in substantially the same plane as that in which the fibre optic cables connected to the patch panel 14 are directed.

A kit of parts for forming a variety of cable guides is shown in Figure 6. In the left hand side of the figure are shown four modular components (modules number 1 to 4) and in the right hand side four cable guides (A, B, C and D) which may be formed from the modular components. Module number 1 has an upstanding protective wall 17 which is semicircular cylindrical in shape. It is provided with an opening 18 and retaining tab 19 for interlocking and engaging with other of the modular components. Module number 2 has an upstanding protective wall 20 which is substantially linear. It is also provided with a projecting lug 21 and retaining tab 22. Module number 3 has an upstanding protective wall 23 which is part-circular cylindrical in shape. It has an outwardly extending projection 24, the function of which is discussed below. Module number 4 has an upstanding protective wall 25 which is also part-circular cylindrical. It also has a inwardly extending recess 26 substantially corresponding in shape and position to the projection 24 of module number 3.

The modular components (modules 1, 2, 3 and 4) can be assembled to provide a variety of cable guides. As an example two module number 1 components can be snap fitted together to form a circular cylindrical cable guide A having a solid protective wall. A circular cylindrical cable guide B having a passageway 27 for the lateral removal of cables passing through the guide may be formed from a combination of modules 1, 3 and 4. The projection 24 of module number 3 and the corresponding recess 26 on module number 4 serve to define a bend 28 in the passageway 27. An oval cable guide C can be formed from a combination of a pair of module 1 components with a pair of module 2 components interspaced between them. A similar cable guide D, but this time having a passageway 27 for the lateral removal of cable, can be formed by the combination of a pair of module 2 components with a module 1, 3 and 4 component.

The cable guide C shown in Figure 6 is shown mounted upon a mounting bracket 28 in Figures 7, 8 and 9. In more detail the cable guide C comprises an outwardly tapering funnel or trumpet shaped sheath formed of two end components 30 of substantially semicircular cross-section and two side components 31 is substantially of linear cross-section. The four components are interlocked together and held within an oval aperture in the mounting bracket 29. The cable guide C is retained in position by a locating pin 32

located within a locating aperture 33 provided on the mounting bracket 29. If required, the cable guide C can be dismantled during use by removing the locating pin 32 from the locating aperture 33 and dismantling of the individual components (30 and 31) from it. Such dismantling would allow cable guided through the cable guide C to be removed from it without disconnection.

In Figure 10, the cable guide C is shown with an additional component, a removable dividing rod 34. The dividing rod 34 divides the guide channel into two sections (35 and 36). The orientation and position of the rod 34 can be varied as required. Cables passing through the channel may be divided into two groups using the rod 34.

In Figure 11 a further embodiment of a cable guide 37 is shown. The cable guide 37 is provided with a substantially rectangular through channel 38 enclosed by a top 39, a bottom 40 and two side walls 41a, b. A passageway 42 is provided between the top of one of the side walls 41a and the top wall 39. That top wall 39 is made of a flexible material so that it may be flexed upwardly to open the passageway 42 to allow cable to be laterally removed from the guide channel 38.

CLAIMS

1. A cable guide having a protective wall defining a through channel, in which cables enclosed by the wall may be supported and guided as they pass longitudinally through the cable guide, wherein the cable guide is provided with a passageway in the protective wall through which cables may be passed out of the channel laterally with respect to the cable guide.
2. A cable guide according to Claim 1, wherein means are provided for transposing the cable guide from a first position in which the passageway is open to allow the lateral passage of cables to a second position in which the passageway is closed and the lateral passage of cables is prevented.
3. A cable guide according to Claim 1 or 2, which cable guide is composed of more than one longitudinally arranged component and the passageway extends through each of those components so as to extend throughout the longitudinal length of the cable guide.
4. A cable guide according to Claim 3 when appendant to Claim 2, in which the longitudinally arranged components are relatively movably mounted and the cable guide can be transposed between the first and second positions by relative movement of those components so as to effect alignment and disalignment of the passageway extending through each component.
5. A cable guide according to Claim 2 or 4, wherein means are provided for retaining the cable guide in one or either of the first or second positions.
6. A cable guide according to any preceding claim, which is further provided with means for dividing its guide channel so as to allow for organisation of cables passing therethrough.
7. A cable guide according to Claim 6, wherein the dividing means is removably mounted with respect to the cable guide.

8. A kit of modular components capable of being fitted together to form a cable guide having a protective wall defining a guide channel in which cables enclosed by the protective wall may be supported and guided as they pass longitudinally through the cable guide, which kit of parts may also be fitted together to form a second cable guide having a protective wall defining a guide channel in which cables enclosed by the protective wall may be supported and guided as they pass longitudinally through the cable guide, which second cable guide differs in shape and/or form from the first cable guide.
9. A kit of modular components according to Claim 8, wherein one of the cable guides which may be formed is a cable guide according to any one of Claims 1 to 7.
10. A cable guide substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
11. A kit of modular components substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

* * * * *

1/6

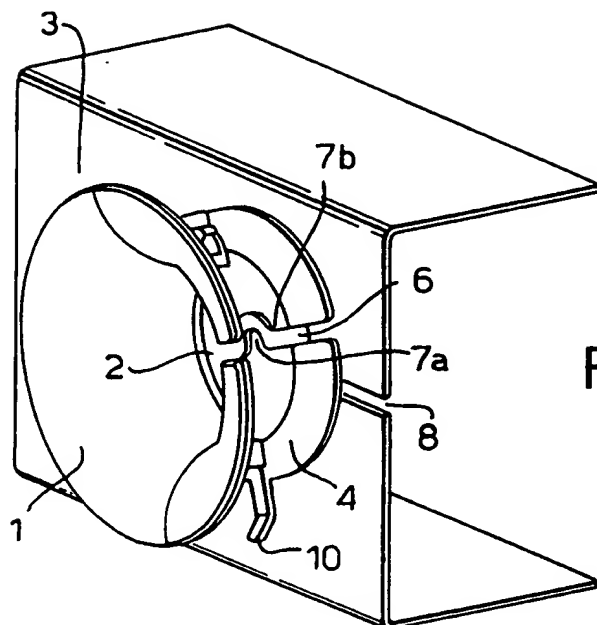


Fig.1.

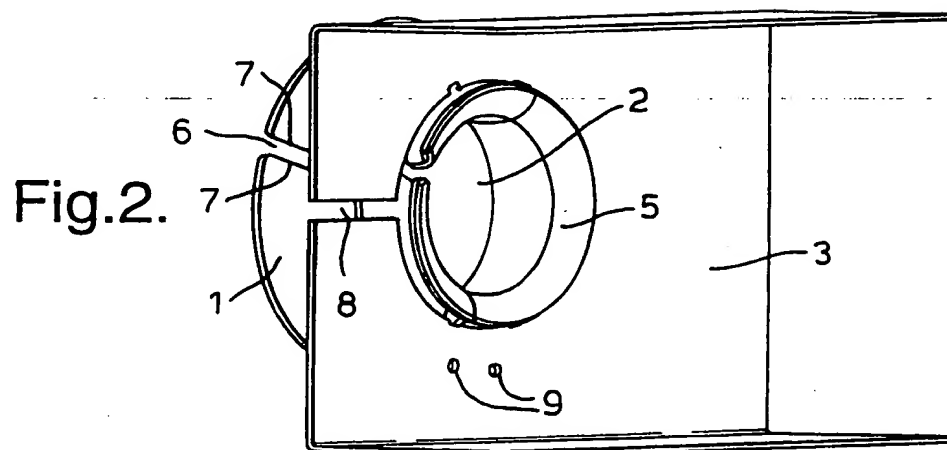


Fig.2.

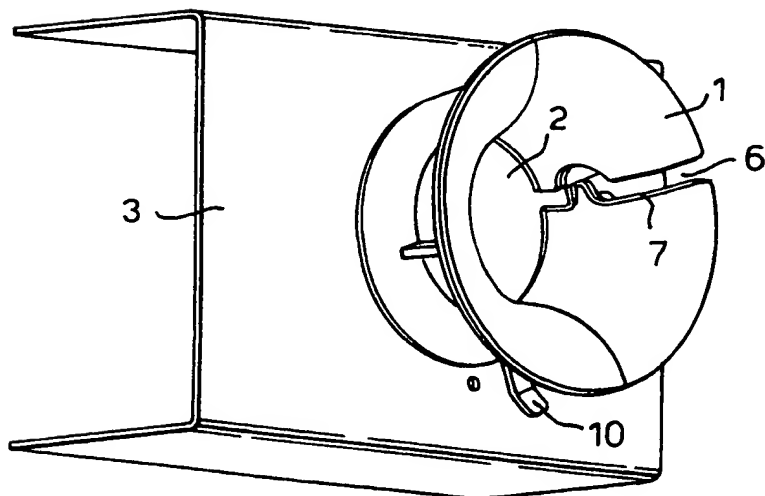


Fig.3.

2 / 6

Fig.4.

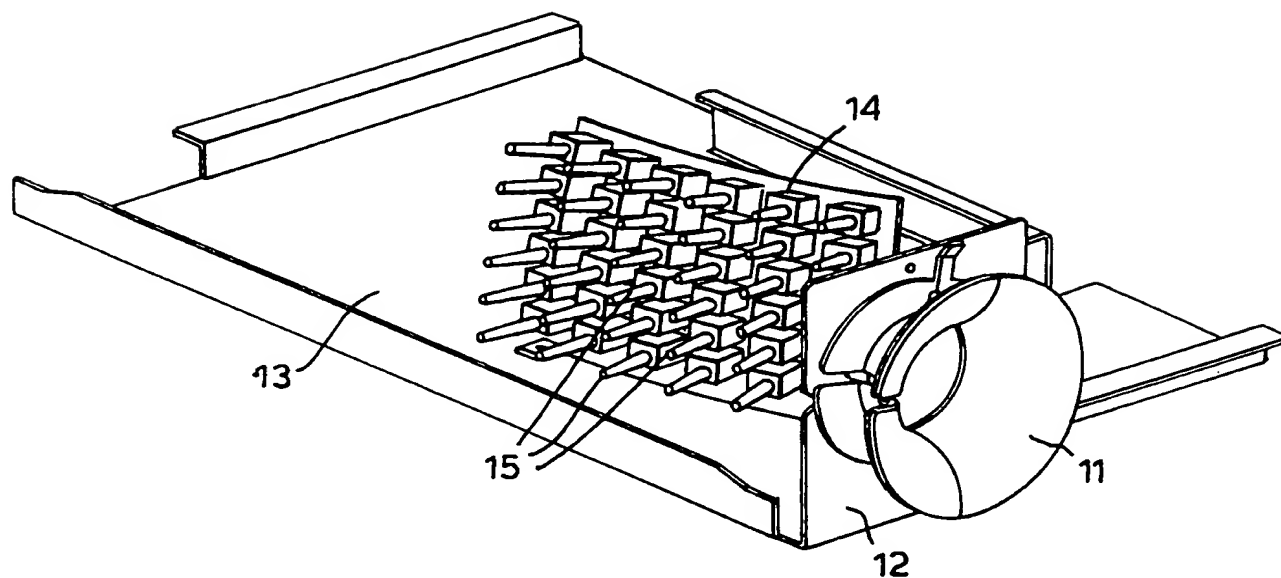
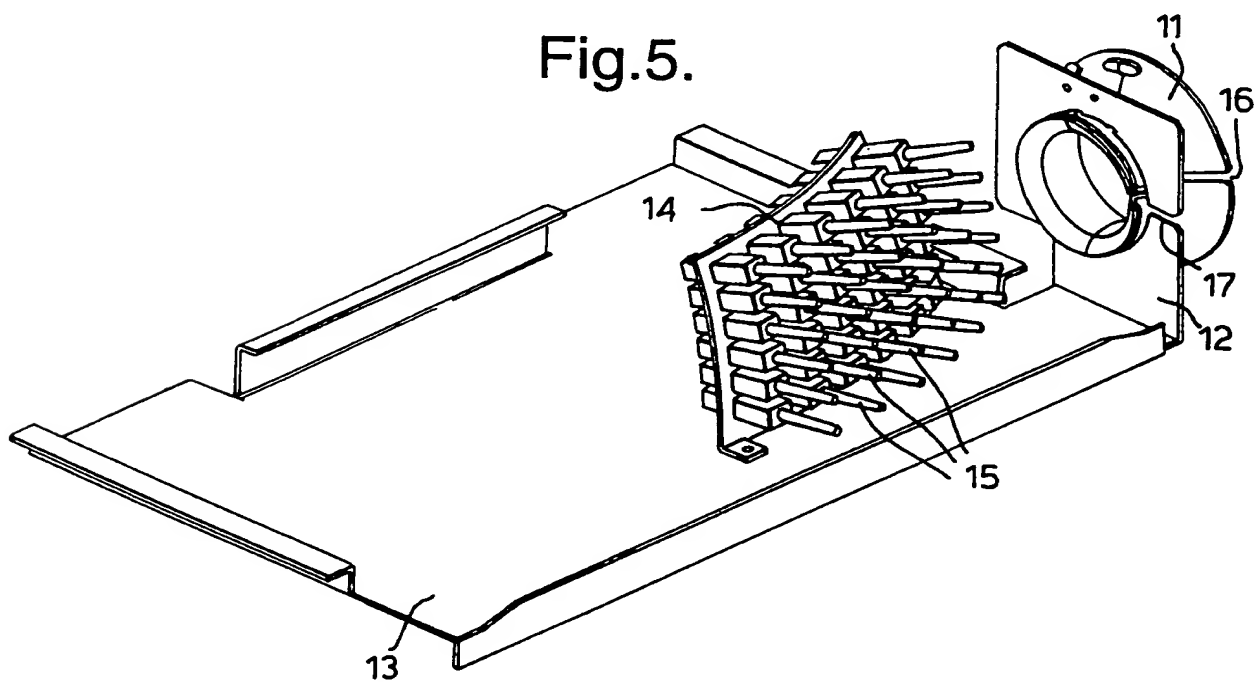


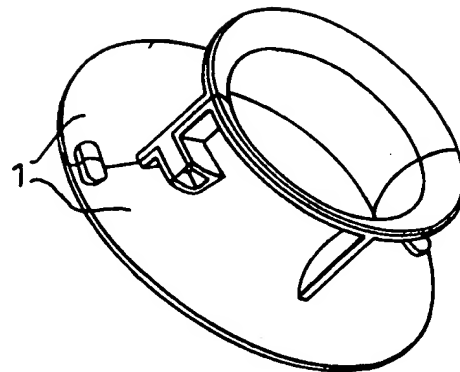
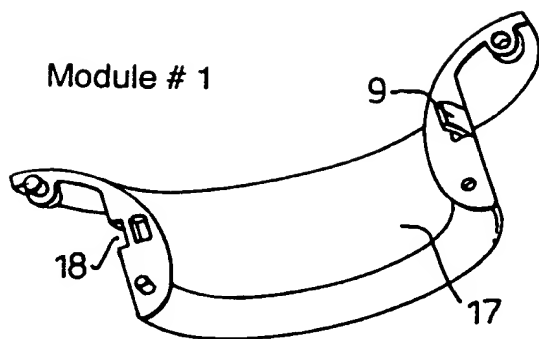
Fig.5.



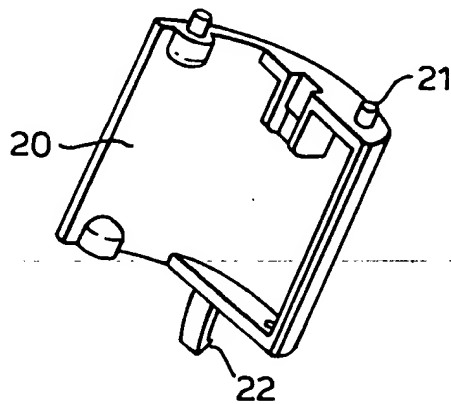
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3 / 6

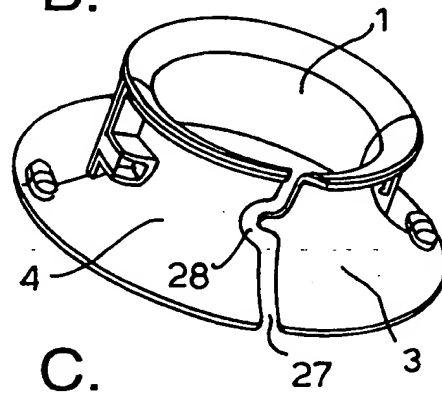
Fig.6. A.



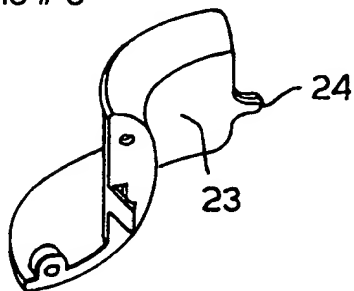
Module # 2



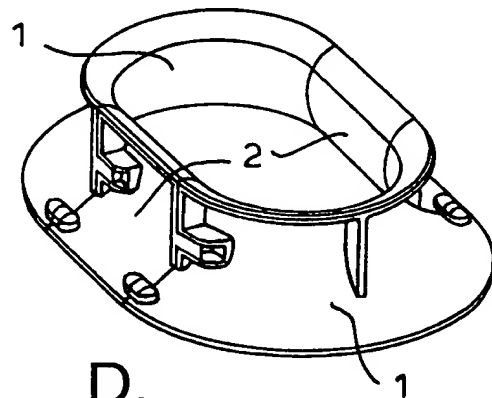
B.



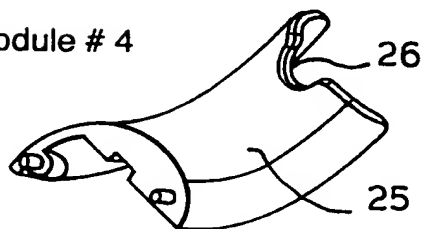
Module # 3



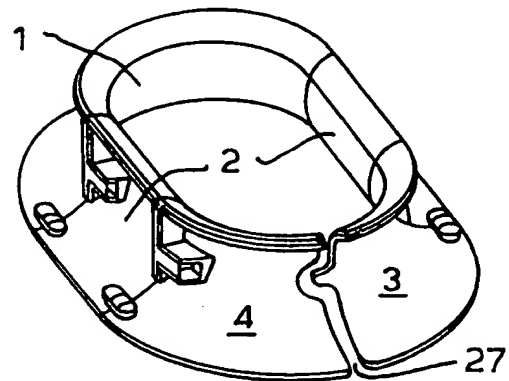
C.



Module # 4



D.



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4/6

Fig.7.

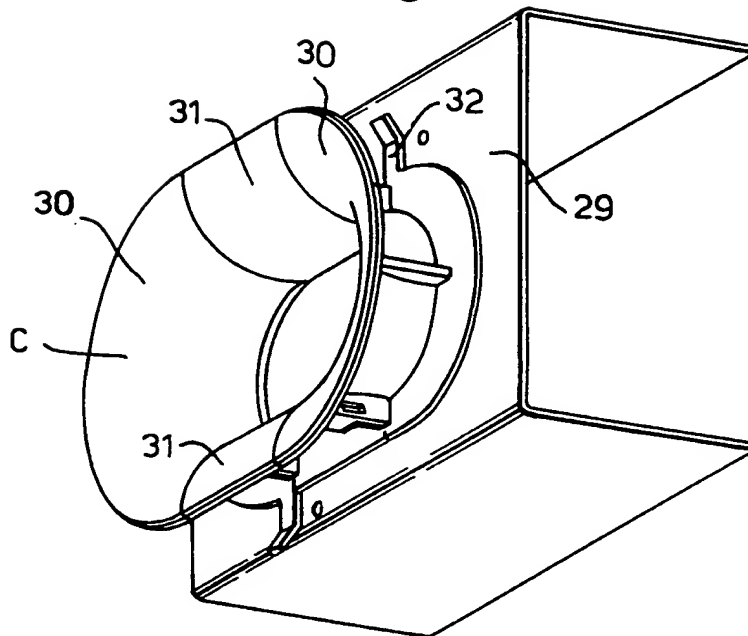


Fig.8.

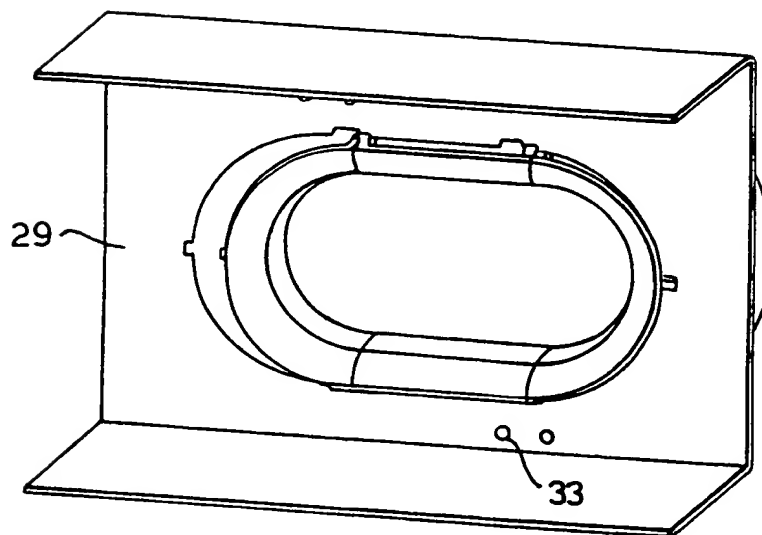


Fig.9.

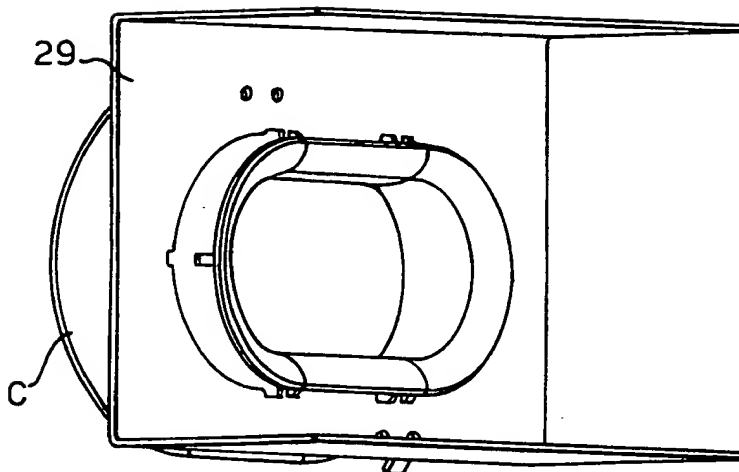
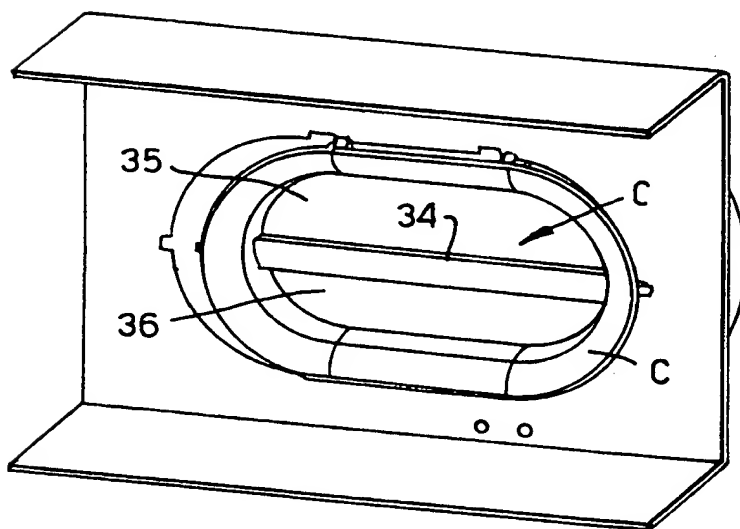
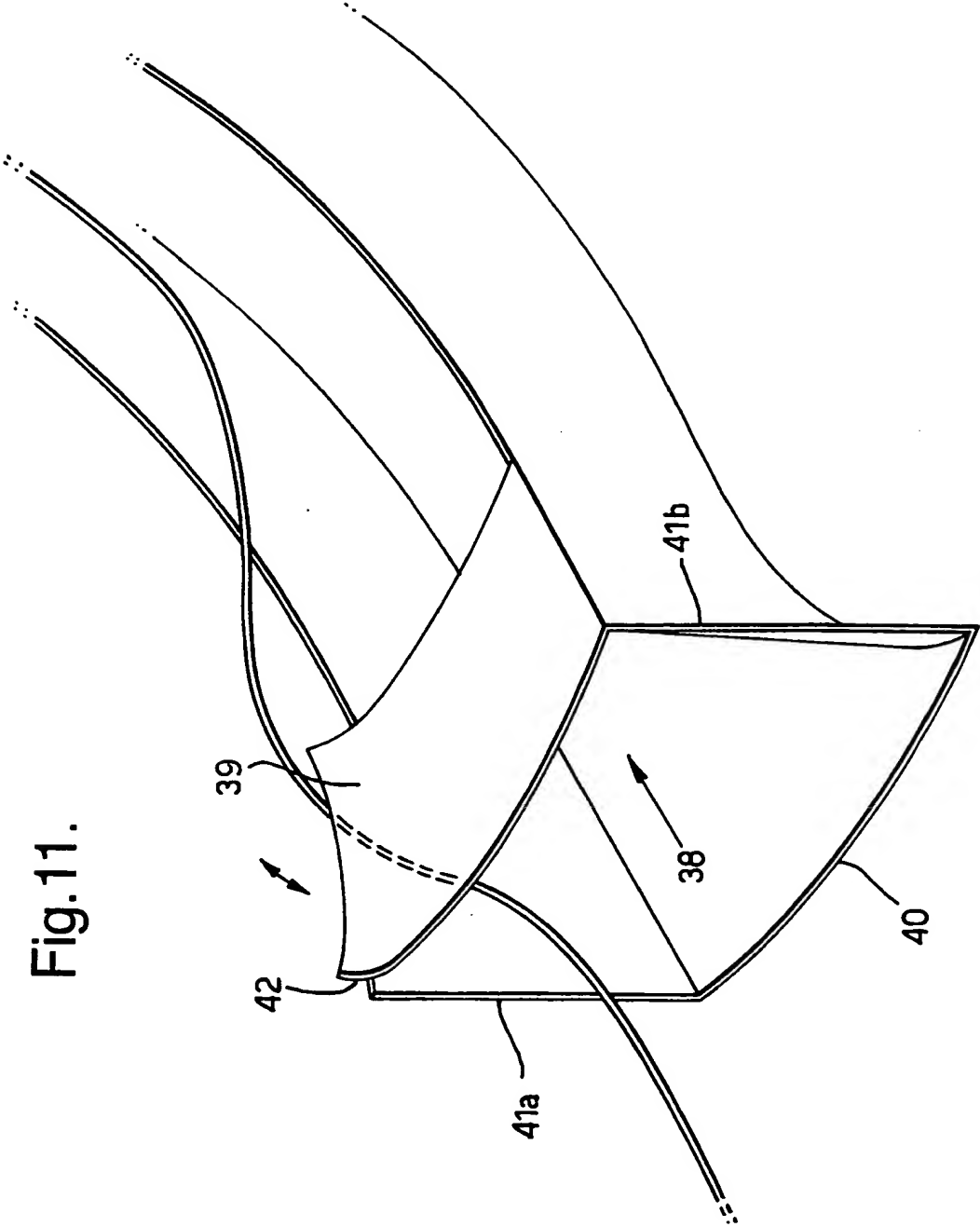


Fig.10.





INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00654

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G02B6/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 699 974 A (JENKINS PETER D ET AL) 23 December 1997 see claims; figures	1
A	DE 35 27 914 A (STANDARD ELEKTRIK LORENZ AG) 12 February 1987 see claims; figures	1
A	DE 37 42 448 A (PHILIPS PATENTVERWALTUNG) 29 June 1989 see claims; figures	1
A	GB 2 287 137 A (INT COMPUTERS LTD) 6 September 1995 see claims; figures	1,3
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"cable strain relief"</p> <p>IBM TECHNICAL DISCLOSURE BULLETIN, vol. 35, no. 2, 1 July 1992, pages 136-137, XP002086184</p> <p>us</p> <p>see page 136 - page 137; figures -----</p>	1,3,6,8

INTERNATIONAL SEARCH REPORT

Information on patent family members

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